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BOTANY.—*Four southwestern subspecies of Phlox.*¹ EDGAR T. WHERRY, University of Pennsylvania.

Study of the Phloxes of Arizona in the preparation of a treatment of the genus in Dr. T. H. Kearney's forthcoming flora of that State has indicated the occurrence there of four plants that seem best regarded as subspecies but have never been assigned to that status. In the present note these are formally described and named.

Phlox diffusa Bentham²

This species has already been divided into two subspecies, *longistylis* Wherry³ of British Columbia to northern Oregon, and *typica* Wherry³ of southern Oregon to south-central California. A third subspecies has now been found to occur on mountains and plateaus of the Great Basin region and may be known as:

Phlox diffusa subcarinata Wherry, subsp. nov. Fig. 1

Clumps averaging 7 cm high, with the densely leafy shoots 4 cm long. Deep-green linear-subulate leaves averaging 10 mm long and 1.25 mm wide, superficially glabrous or sparse pubescent, basally ciliate. Cyme of 1 to 3 flowers on pedicels 1 (rarely 2 or 3) mm long. Sepals averaging 9 mm long, united for one-half to two-thirds their length into a tube, with somewhat carinate intercostal membranes, sometimes glabrous but usually basally pubescent, often more densely so than in the other two subspecies. Corollas white to lavender, the tube averaging 11 and lobes 7 mm long. Styles 3 to 6 or rarely 7 mm long, united to within 1 mm of the tips.

P. diffusa typica similis sed compactior; calycis membranis intercostalis subcarinatis.

Type.—In herbarium of Academy of Natural Sciences of Philadelphia, from Mount Rose, Washoe County, Nev., Heller 9910a, July 29, 1909. A sketch of one of the plants on the type sheet is reproduced herewith.

Range.—Washington and Idaho to California and Arizona, chiefly at altitudes of 5,000 to 10,000 feet in the Great Basin, and rarely in the Sierras. Localities represented in the larger eastern herbaria:

WASHINGTON: Mount Spokane (n. limit, lat. 47° 53'), Tumwater Mountain, Klickitat Hills.

¹ Received August 28, 1939.

² Pl. Hartw.: 325. 1849.

³ Proc. Acad. Nat. Sci. Philadelphia 90: 139. 1938.

OREGON: Maupin, Strawberry Lake, Crane Mountain.

IDAHO: Brundage Mountain.

CALIFORNIA: Bray, Mount Shasta, Truckee, Pine City, Mount Kaiser, Mineral King, Mount Pinos (s. limit, lat. 34° 48').

NEVADA: Mount Rose, Franktown, Carson City, Kings Canyon.

UTAH: Virgin River Valley.

ARIZONA: Jacobs Lake and points southward, north rim of Grand Canyon.



Fig. 1.—*Phlox diffusa subcarinata* Wherry, subsp. nov. Drawn by Miss Inez Renninger.

Phlox austromontana Coville⁴

The acerose-leaved plant with markedly carinate calyx-membranes to which this name was originally applied has short-decumbent or erect stems forming a compact clump, its longest leaves 12 to 20 mm, its corolla-tube 8 to 14 mm, and its styles 2.5 to 5 mm in length. The subspecies represented may be known as *P. austromontana vera* Wherry, nomen novum.

A variant of the species with long-decumbent stems forming an open clump, longest leaves 15 to 30, corolla-tube 12 to 18 mm, and styles 4.5 to 6 mm in length has been named by E. Nelson⁵ var. *prostrata*. Its differences from the original subspecies are so marked, however, that it is here raised to subspecies rank: *P. austromontana prostrata* (E. Nelson) Wherry, status novus.

In his monograph of the genus, Brand⁶ segregated from *P. austromontana* a supposedly distinct species, which he named *P. densa*. He noted that this had the aspect of an alpine form of the earlier species but considered its longer style to be distinctive. Study of a series of specimens of both indicates

⁴ Contr. U. S. Nat. Herb. 4: 151. 1893.

⁵ Rev. W. N. Amer. Phlox: 19. 1899. Also named *Phlox acerba* by A. Nelson, Amer. Journ. Bot. 25: 114. 1938.

⁶ Engl. Pflanzenr. IV. 250: 83. 1907.

that no correlation exists between style-length and any other character, and as extensive intergradation is shown the two can scarcely be maintained as independent. The plant with especially compact habit, longest leaves 8 to 12 mm, corolla-tube 8 to 14 mm, and styles 3 to 6 mm in length is therefore here made a subspecies: *P. austromontana densa* (Brand) Wherry, status novus.

All three of these subspecies were first described from southwestern Utah; subsp. *vera* is now known to occur in all the Western States south of lat. 45°. Subsp. *prostrata* extends to southern California, where it is especially frequent, and to southeastern Arizona. Subsp. *densa* apparently occurs only from west-central Utah to middle Arizona.

ZOOLOGY.—*Observations on the distribution and ecology of the oribatid mites.*¹ WENDELL H. KRULL, U. S. Bureau of Animal Industry.

The oribatid mites have been incriminated only recently as intermediate hosts of economically important tapeworms of livestock. Stunkard (1937) reported recovering from experimentally infected mites, *Galumna* sp., cysticercoids of the common sheep tapeworm, *Moniezia expansa*. Later Stunkard (1939) reported in detail the experiments leading to this discovery and noted that "all the mites used fall within the generic concept of *Galumna*." He did not, however, identify definitely the infected mites as to species. Stunkard's work has subsequently been confirmed by Stoll (1938) and by the writer (Krull, 1939). Stoll reported infecting two kinds of mites, *Galumna* sp. and *Galumna nigra* (Ewing), by feeding to these arthropods eggs of *Moniezia expansa*, while the writer recovered infective cysticercoids of this tapeworm from mites, *G. emarginata* (Banks), which had been collected on pastures. The cysticercoids collected by the writer were administered to a tapeworm-free lamb, and specimens of *M. expansa* were recovered from this host animal at necropsy.

Although extensive studies on the oribatid mites have been published by Michael (1884, 1898), Banks (1915), Ewing (1917), and Jacot (1937), very little is known of their distribution and ecology. In order to obtain information on these points, which is needed before control measures for the anoplocephaline tapeworms of livestock can be formulated, a preliminary investigation was undertaken to determine under what conditions these mites occur, and the influence of climatic and other factors on their distribution and abundance. The results of this investigation are given herein. Some preliminary observations on the food habits of these mites and attempts to culture them are also included.

¹ Received June 27, 1939.